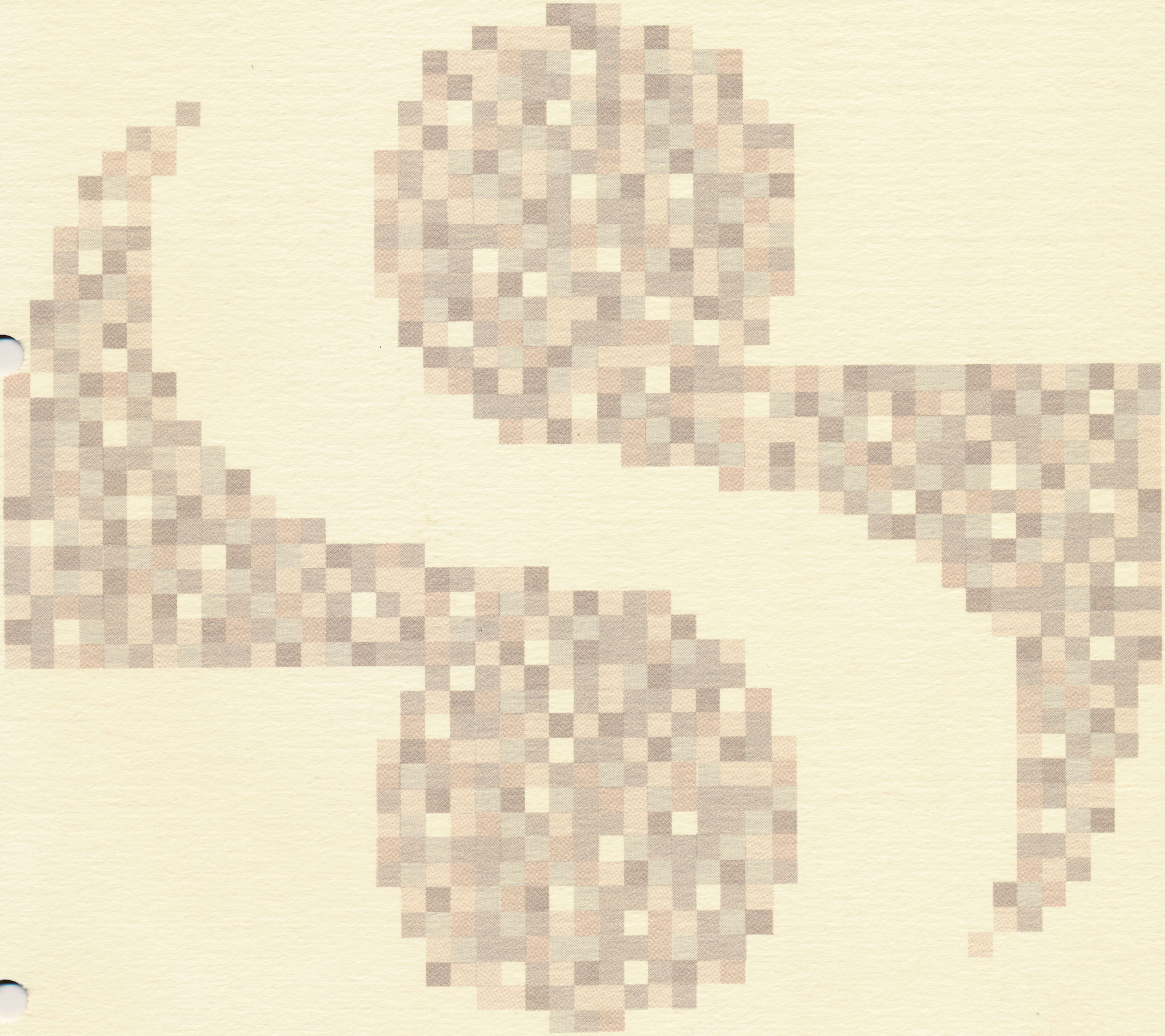
I. P. Sharp Associates



In today's business world, effective use of computing technology can give you an edge in the marketplace. More and more companies now rely on the computer to help organize and expedite business information. At I.P. Sharp Associates, we meet the diverse demands of business and industry by providing a comprehensive range of computer services and products.

Time-sharing with a difference

As with many time-sharing services, our customers have access to an impressive collection of public data bases and application packages. The difference is that all data processing is in APL. And more important, our communications network provides customers in North America, Europe and Australia with local access to our Toronto computers. For many multi-national companies, the network provides a solution to the problem of intra-corporate communications. Each branch or division has instant access to a common set of programs and data, regardless of geographical location.

SHARP APL on your own computer

Perhaps you are using our APL time-sharing service but now can justify the acquisition of an in-house service of your own. To accommodate customers with in-house facilities, we offer SHARP APL as a distributed program product. A version of our software system, complete with APL language extensions, application packages, and access to our communications network, can be produced to run under a variety of IBM operating systems.

Minicomputer expertise

Our Special Systems division has more than a decade of experience in the specification and implementation of minicomputer systems. The successful development of systems for process control, telecommunications, research, and business accounting applications has helped us to establish a reputation for technical excellence and reliability.

Whatever your computing requirements

We are dedicated to helping you solve your problem quickly and effectively. Since 1964, I.P. Sharp Associates has expanded from a small group of hardware and software consultants to become a multi-national company. This substantial growth has been the result of our responsiveness to the changing demands of business and industry. Each of the services we offer is an integral part of our continuing effort to satisfy your specific computing needs.

SHARP APL

Why offer only one language?

Having the system "up" when you need it is crucial. System reliability is to a large degree a function of the number of program products offered. We feel that our outstanding reliability record has been due to our commitment to APL specialization. The decision to concentrate our expertise in one area has resulted in a quality product and knowledgeable staff.

Why APL?

The conciseness and power of APL make it ideal for the time-sharing environment. APL has the ability to handle arrays in a simple but extremely efficient manner, resulting in code that's concise and rapidly prepared. It has been estimated that in most applications, the use of APL increases programmer productivity by a factor of 5. The language contains many "built-in" functions that elsewhere would require special programs. The APL system offers powerful debugging aids; when an error is detected, it's often possible to fix it on the spot, and immediately resume work. Non-programmers are able to learn a subset of APL and use it effectively within a few hours.

These qualities, along wth APL's amazing flexibility, result in a language well suited to business applications, particularly those which involve continuing analysis and development. Using APL, the time devoted to the original development of a system is drastically reduced. Customized solutions to problems can often be produced in less time than it would take to modify an existing solution in a conventional language.

An expanding range of applications

Because we offer only one language, our software personnel have been able to concentrate on the development of APL programs which serve an increasingly wide variety of applications. Although once regarded as a specialized scientific language, APL has gained widespread acceptance as the language most capable of coping with the problems and systems of the business environment. It promises savings in both time and money.

Ongoing development

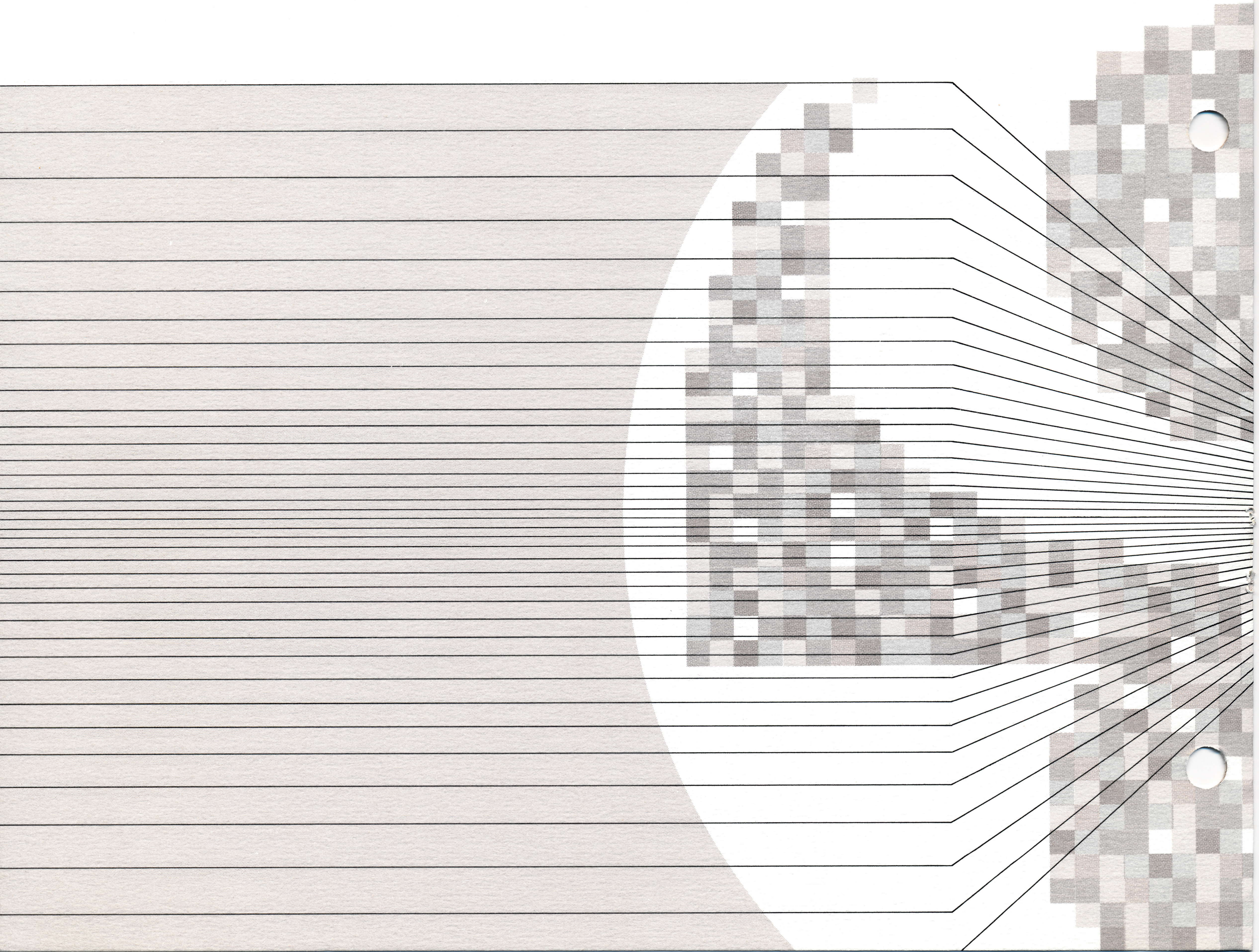
At I.P. Sharp Associates, there is a strong commitment to the ongoing development of our APL system. Since 1969, when we pioneered one of the first commercial APL time-sharing services, we have been involved six times in the design of APL systems for major computer manufacturers. Over the years, the language and system enhancements we have implemented have helped to make SHARP APL a leader in the industry.

The Communications Network

Today, many multi-national companies are recognizing the need for fast, reliable communications with subsidiaries and branches. Our communications network has fulfilled this need by providing local dial-up access to the SHARP APL time-sharing service in nearly 200 cities in North America, Europe and Australia. This facility is available at no extra cost to customers. Connect charges are the same low figure (equivalent to about one dollar an hour) whether you're located in Brussels, Sydney, Toronto or New York.

The network enables each division of a company to access and manipulate a common set of programs and data regardless of its geographical location. As well as benefiting from shared usage of their private financial, planning, distribution and scheduling data bases, these companies also have access to SHARP APL public data bases and application packages to help with tasks such as budgets and financial consolidation.

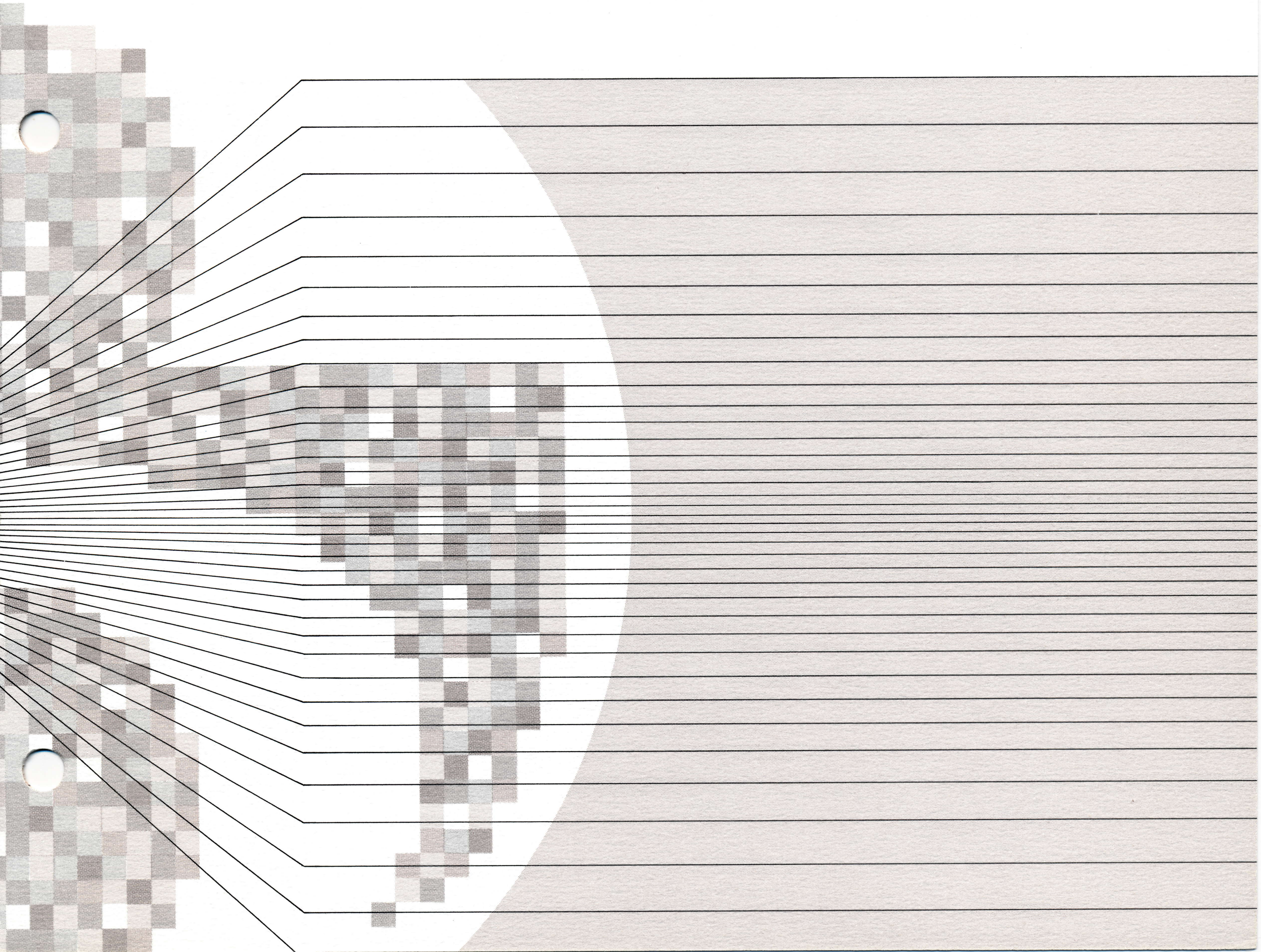
The hardware behind the network consists of mini-computers scattered across three continents. These machines are connected by highspeed lines to form the communications "chain". High capacity transoceanic cables link North America, Europe and Australia. In the United States, our network is also interfaced with other major communications networks, providing local access to an even broader range of remote locations. To access our time-sharing service, you simply dial the nearest network access location on normal telephone lines.



The software for the network was developed by our Special Systems division. As a result of their work, we were able to offer a commercial terminal-based packet-switched network which was the first of its kind. The term "packet-switched" means that all messages sent between APL and a terminal are sent as one or more fixed length "packets". As it travels through the network, each packet is checked for errors, and re-transmitted if necessary, resulting in virtually error-free transmission.

Moreover, each minicomputer is able to recognize the type of terminal you are using and to provide you at all times with the status of your link to the central system. The flexibility of the network software allows it to be modified for custom applications such as connecting directly to a customer's computer system or to a special-purpose terminal device. For example, the network is currently used to support a Telex facility which automatically accepts and stores Telex messages.

Our packet-switched communications network provides unrivalled benefits: high reliability, fast response, virtually error-free transmission, flexibility in the choice of terminals and low connect charges. The success of the network has resulted in a continuing commitment to its development and expansion with the aim of providing world-wide access to SHARP APL time-sharing facilities.



Data Bases

The successful development of many business applications depends on having access to up-to-date on-line information. Our time-sharing service makes available a number of public data bases which contain an extensive amount of economic, demographic, security market and industry-related information. In most cases, there's no charge for this data, other than the usual rates for any calculations you perform on it.

Typically for each data base, there are several easy-to-use retrieval packages designed to facilitate your data analysis. The packages are put together in modular fashion, so if they don't already meet your specific needs, it's easy to adapt them.

If your application is related to the AIRLINE industry, information such as revenue, expense, traffic statistics, and passenger itineraries for commercial carriers is available in the Form 41, Origin-Destination and Economic Regulation 586-Service Segment data bases.

Extensive SOCIO-ECONOMIC data, including such information as international liquidity, wholesale and consumer price indices and currency exchange rates, is contained in the CANSIM, NBER, CSO, NFS, IFS, USWPI, USCPI, and Currency data bases.

To help with applications related to BANKING, we provide access to the weekly financial statistics for the Bank of Canada. In addition, asset and liability facts, revenue, expense, and year-end statements for each of Canada's chartered banks is available in the Chartered Banks Monthly, Quarterly and Annual data bases.

SECURITIES information including, New York, American and Canadian stock exchange data and daily trading data for call options traded on Toronto, Montreal and trans-Canada exchanges is accessible from the Stock Exchange and Canadian Stock Options data bases.

The ACTUARIAL data base contains readily accessible information on insured lives, annuitants and the general population, taken from over 100 published tables.

For applications which involve the creation of a private data base, programs are available to help you with the maintenance and manipulation of private on-line information.

Application Systems

Often the first contact our customers have with the SHARP APL system, is through the use of one of our application packages. Since many of these require no prior knowledge of APL, they provide a ''quick start'' for those who don't possess APL expertise.

The packages described below are representative of the broad range of programs which are available to help you with the efficient development of just about any business application.

Magic: A collection of English language commands used to retrieve, manipulate and display time series data.

AIDS: A system for the development of planning, forecasting and control models.

Mailbox: An electronic mail facility which provides a mechanism for communication between people rather than places.

Actuarial Package: A comprehensive set of utility programs which embodies a standardized linear representation of the international actuarial notation.

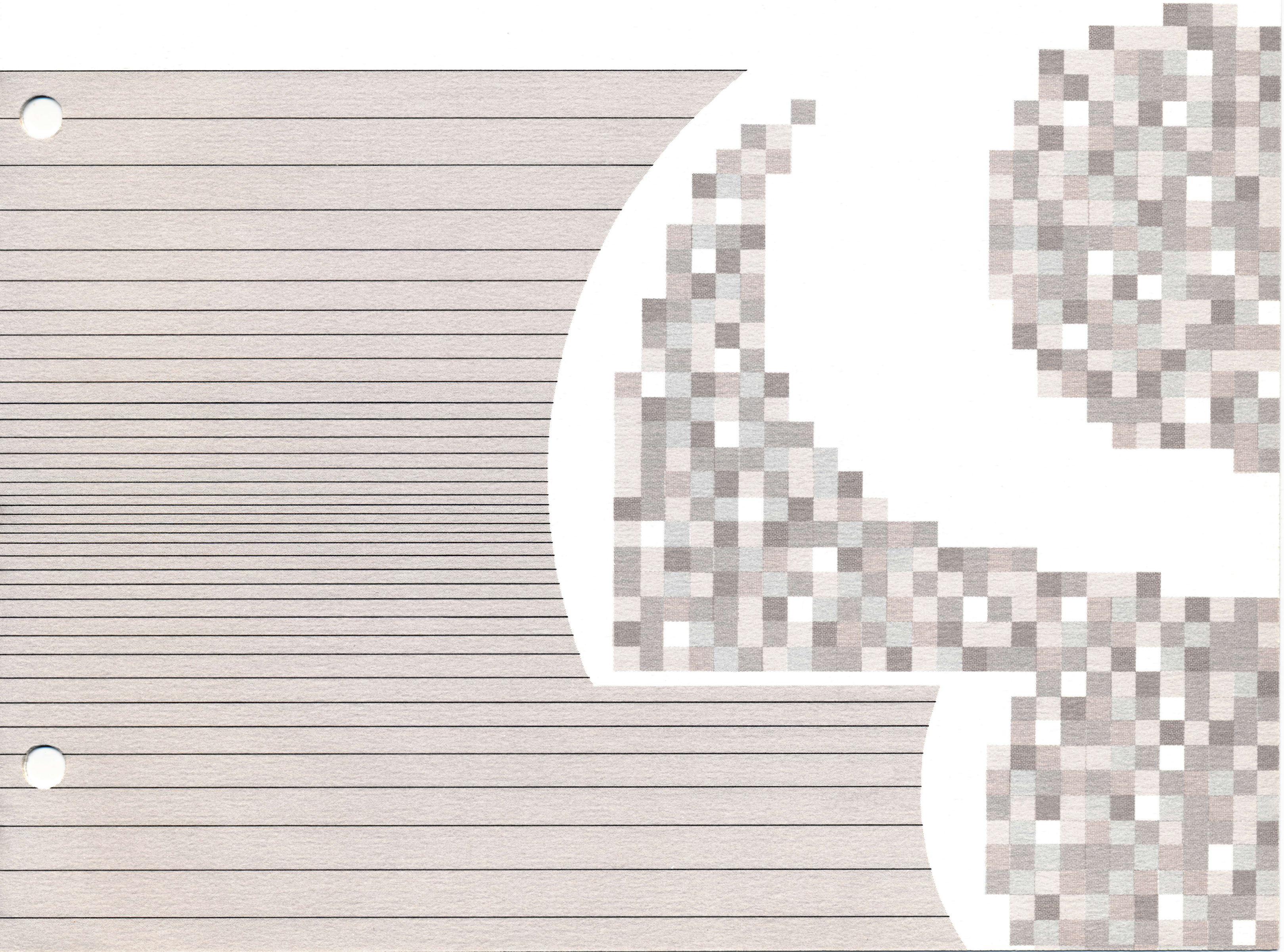
GOFER: A simple and flexible system designed to help in the analysis of the profitability of developing gas and oil fields.

Portfolio Management: A record-keeping system for managing and analyzing investment portfolios for both the retail and institutional investor.

Statistical Analysis: A collection of statistical functions to be used in such areas as data entry and manipulation, parametric and non-parametric statistics, correlation, regression and analysis of variance.

Graphics: A general-purpose computer graphics system designed to support line drawings on a variety of terminals. Typical applications include business plotting, floor plan layouts, cartography, animation and mechanical drawings.

SARTEMS: A text management system which provides facilities for the storage, correction and retrieval of non-numeric data.



Support, Education and Consulting

To ensure that you make the most effective and economic use of the computing services and products at I.P. Sharp Associates, we provide:

Customer support

Our customer support personnel are on hand to answer any questions you may have about our system, as well as to offer APL programming advice and explain new system features. Most likely you will find that you can do what you want to do quite easily using SHARP APL. But to guarantee that your productivity remains high, we stand by to support you with guidance, advice and that second opinion which helps make an adequate result superlative.

Education and documentation

Each of our offices holds courses and seminars on SHARP APL and related application systems. These courses can be adjusted to fit your particular interests and conducted at your own office if you wish.

All of our application packages are backed by on-line documentation. In addition, we provide an extensive collection of manuals which document many of the application packages and various SHARP APL system features.

Consulting

Whether you are faced with a temporary overload of design or programming work, or you have a problem whose solution requires specialized expertise, we can provide you with the qualified individual you need to get the job done. Over the years, our consultants have developed a high level of competence in:

- project management
- feasibility studies
- facilities management
- contract programming
- system specification and design
- minicomputer hardware evaluation and acquisition
- design and selection of communications facilities

Many of our consultants, as well as being knowledgeable in APL, have an extensive background in other languages and in such specialized areas as accounting, econometrics, financial analysis, data base management systems, file conversions and graphics.

Our Special Systems division provides consulting services in all areas of computer systems implementation. In particular, Special Systems consultants have a wide range of expertise in the development of turnkey systems on mini and microcomputers.

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North America
Europe and Australia